MOTOROLA DIGITAL RETURN SYSTEM

STARLINE® SG4-DRT-2X Transmitter
OmniStar® GX2-DRR-2X Receiver

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SG4-DRT-2X

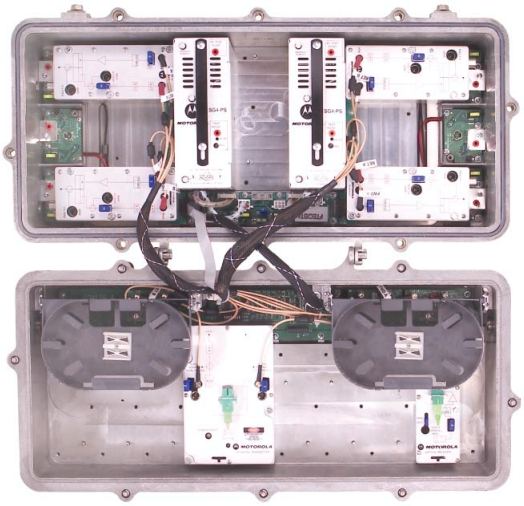
The SG4-DRT-2X uses 10-bit A/D technology to double the return bandwidth capacity and allows system operators to segment Starline® SG4000 node locations. The 2X Time Domain Multiplexing (TDM) system enables you to split the node return path traffic in half, treating each half as a separate return path stream. Both streams are combined on a single transmitter for optimum utilization of fiber. You can also install an additional transmitter to provide equipment and path redundancy.

The SG4-DRT-2X transmitter module uses a state-of-the-art isolated, cooled, Distributed Feedback (DFB) laser for improved link performance. These transmitters use lasers based on the International Telecommunications Union (ITU) frequency grid plan spaced at 100 GHz. The system is completely scalable and can be expanded from a single transmitter/receiver to groups of 4, 8, 16, or 32 wavelengths over a single fiber with the use of muxing and demuxing equipment. The system is compatible with Motorola low noise optical amplifiers (EDFAs), allowing network designs that cover large geographical areas. Without amplification, the Motorola 2X DWDM digital return system is capable of achieving a link loss budget of 26 dB.

Each module accepts two unique 5-65 MHz return signals at its input. Each input is digitized with a high-speed A/D converter and then converted into a 3.1Gbps TDM data stream that drives the laser. The optical detector, together with the demultiplexer, decoder, and amplifier are contained in the Omnistar® GX2-DRR-2X digital return receiver.

With the implementation of time division multiplexing, Motorola's 2X digital return simplifies node segmentation in the Starline® SG4000.

The SG2-DRT-2X features an enable/fault LED to report local status information. An integrated optical bulkhead connector provides simple, quick-connect module installation and facilitates easy connector cleaning. All necessary cables required to install the SG4-DRT-2X in SG4000 nodes are included with every transmitter.



To facilitate easy upgrades, the SG4-DRT-2X has the same set-up levels as the analog return transmitters. The double-wide module occupies the same locations as two analog transmitters in the node lid.

BENEFITS INCLUDE:

- 5-65 MHz Return Path Operation
- High optical output power +8 dBm
- Excellent noise power ratio (NPR) 40/11
- Easy upgrade path for node segmentation
- 40 DWDM wavelengths available
- Downloadable firmware
- Plug-n-Play installation and operation

GX2-DRR-2X

At the receive location, the optical signal is converted back to the TDM data stream, then demultiplexed and decoded, resulting in the two unique 5-65 MHz RF output signals.

The GX2-DRR-2X, digital return path receiver module occupies a single slot in the OmniStar GX2 optical broadband transmission platform. Available with SC/APC or E2000 optical connector, the GX2-DRR-2X receiver also features convenient front panel RF test points. The receiver has a dynamic input range of 0 to -18 dBm and an RF output level capable of +50 dBmV.

Several communication methods are available for real-time monitoring and control. A tri-colored LED on each module indicates the general operating status. The optional shelf door unit with display provides monitoring and local control with an alphanumeric display and simple push button navigation.

By navigating through the GX2-DRR-2X menus, you can view status and alarms pertaining to various optical, RF, and electrical parameters. You can also make changes to selected operating parameters to customize the link. Additionally, a PC interface is available through an Ethernet port on the front panel of the GX2-CM100B control module. Using a standard Web browser, the Graphical User Interface (GUI) provides a point-and-click method of configuring modules in the OmniStar GX2 chassis.

For higher-level management, you can easily connect the OmniStar GX2 to a remote Element Management System (EMS) or Network Management System (NMS) using the standard Simple Network Management Protocol (SNMP) interface provided through an Ethernet port on the rear panel of the GX2-CM100B control module.

The GX2 Digital Return Receiver offers performance and reliability in a high-density package.

2X DIGITAL TRANSMITTER MODULES FOR SG4000 NODE

Part Number	Model Name	Description	ITU Channel	Wavelength (nm)
504389-020-00	SG4-DRT-2X-CH20	2X Digital Return Transmitter	20	1561.42
504389-021-00	SG4-DRT-2X-CH21	2X Digital Return Transmitter	21	1560.61
504389-022-00	SG4-DRT-2X-CH22	2X Digital Return Transmitter	22	1559.79
504389-023-00	SG4-DRT-2X-CH23	2X Digital Return Transmitter	23	1558.98
504389-024-00	SG4-DRT-2X-CH24	2X Digital Return Transmitter	24	1558.17
504389-025-00	SG4-DRT-2X-CH25	2X Digital Return Transmitter	25	1557.36
504389-026-00	SG4-DRT-2X-CH26	2X Digital Return Transmitter	26	1556.56
504389-027-00	SG4-DRT-2X-CH27	2X Digital Return Transmitter	27	1555.75
504389-028-00	SG4-DRT-2X-CH28	2X Digital Return Transmitter	28	1554.94
504389-029-00	SG4-DRT-2X-CH29	2X Digital Return Transmitter	29	1554.13
504389-030-00	SG4-DRT-2X-CH30	2X Digital Return Transmitter	30	1553.33
504389-031-00	SG4-DRT-2X-CH31	2X Digital Return Transmitter	31	1552.52
504389-032-00	SG4-DRT-2X-CH32	2X Digital Return Transmitter	32	1551.72
504389-033-00	SG4-DRT-2X-CH33	2X Digital Return Transmitter	33	1550.92
504389-034-00	SG4-DRT-2X-CH34	2X Digital Return Transmitter	34	1550.12
504389-035-00	SG4-DRT-2X-CH35	2X Digital Return Transmitter	35	1549.32
504389-036-00	SG4-DRT-2X-CH36	2X Digital Return Transmitter	36	1548.52
504389-037-00	SG4-DRT-2X-CH37	2X Digital Return Transmitter	37	1547.72
504389-038-00	SG4-DRT-2X-CH38	2X Digital Return Transmitter	38	1546.92
504389-039-00	SG4-DRT-2X-CH39	2X Digital Return Transmitter	39	1546.12
504389-040-00	SG4-DRT-2X-CH40	2X Digital Return Transmitter	40	1545.33
504389-041-00	SG4-DRT-2X-CH41	2X Digital Return Transmitter	41	1544.53
504389-042-00	SG4-DRT-2X-CH42	2X Digital Return Transmitter	42	1543.73
504389-043-00	SG4-DRT-2X-CH43	2X Digital Return Transmitter	43	1542.94
504389-044-00	SG4-DRT-2X-CH44	2X Digital Return Transmitter	44	1542.14
504389-045-00	SG4-DRT-2X-CH45	2X Digital Return Transmitter	45	1541.35
504389-046-00	SG4-DRT-2X-CH46	2X Digital Return Transmitter	46	1540.56
504389-047-00	SG4-DRT-2X-CH47	2X Digital Return Transmitter	47	1539.77
504389-048-00	SG4-DRT-2X-CH48	2X Digital Return Transmitter	48	1538.98
504389-049-00	SG4-DRT-2X-CH49	2X Digital Return Transmitter	49	1538.19
504389-050-00	SG4-DRT-2X-CH50	2X Digital Return Transmitter	50	1537.4
504389-051-00	SG4-DRT-2X-CH51	2X Digital Return Transmitter	51	1536.61
504389-052-00	SG4-DRT-2X-CH52	2X Digital Return Transmitter	52	1535.82
504389-053-00	SG4-DRT-2X-CH53	2X Digital Return Transmitter	53	1535.04
504389-054-00	SG4-DRT-2X-CH54	2X Digital Return Transmitter	54	1534.25
504389-055-00	SG4-DRT-2X-CH55	2X Digital Return Transmitter	55	1533.47
504389-056-00	SG4-DRT-2X-CH56	2X Digital Return Transmitter	56	1532.68
504389-057-00	SG4-DRT-2X-CH57	2X Digital Return Transmitter	57	1531.9
504389-058-00	SG4-DRT-2X-CH58	2X Digital Return Transmitter	58	1531.12
504389-059-00	SG4-DRT-2X-CH59	2X Digital Return Transmitter	59	1530.33

2X DIGITAL RECEIVER MODULE

Part Number	Model Name	Description
501782-001-00	GX2-DRR-2X	2X Digital Return Receiver

MODULE SPECIFICATIONS

SG4-DRT-2X TRANSMITTER

OPTICAL

Optical Wavelength	ITU grid (see previous table)
Wavelength Stability	+/- 0.1 nm Max.
Optical Output Power	+8 dBm
Optical Power Test Point Scale	0.5 V/mW
Optical Connector Type	SC/APC or E2000
Optical Output Return Loss	-40 dB Min.

RF

Operational Bandwidth	5 - 65 MHz
Recommended RF Input Level	+23 dBmV, Total power per RF input [3]
Number of Input Channels	2
RF Input Connectors	2 top-side SMB
RF Input Return Loss	16 dB Min.
RF Input Impedance	75 Ohms

GENERAL

Dimensions	2.4" D x 4.2" W x 6.5" L (6.1 cm x 10.7 cm x 16.5 cm)
Weight	1.3 lbs. (0.58 kgs)
Operating Temperature Range	-30°C to +75° C (-22° F to +167° F)
Power Consumption	15 W Max.
Visual Interface	Module Status LED

GX2-DRR-2X RECEIVER

OPTICAL

Optical Input Range	-18 to 0 dBm [4]
Optical Connector Type	SC/APC or E2000
Optical Input Return Loss	-40 dB Min.

RF

Operational Bandwidth	5 - 65 MHz
Output Level	+50 dBmV Max.
Number of Output Channels	2
Output Return Loss	16 dB Min.
Output Impedance	75 Ohms
RF Output Test Point	-20 +/- 0.5 dB
Gain Attenuator Range	20 dB
RF Connector Types	
Output	F-type (using G-to-F adaptor on chassis)
Test Points	F-type

GENERAL

Dimensions	5.9" H x 1.0" W x 15" D (15 cm x 2.5 cm x 38 cm)
Mounting Shelf	GX2-HSG*
Operating Temperature Range	-30°C to +65° C (-22° F to +149° F)
Weight	2.0 lbs. (0.91 kgs)
Power Consumption	17 W Max.
Visual Interface	Module Status LED

LINK SPECIFICATIONS

Noise Power Ratio (NPR)[1]	40 dB over 13 dB dynamic range
RF gain variation over temperature	+/- 1.0 dB
Group Delay[2]	
5 to 9 MHz	30 ns
9 to 61 MHz	15 ns
61 to 65 MHz	25 ns

Notes:

All parameters meet the specified requirements over the entire operating temperature range unless otherwise noted.
1 Typical NPR performance at 25 ± 5°C. Measured with GX2-DRR-2X receiver. Required input level to the Tx is +15 dBmV to achieve the link NPR curve peak. Tested with 100 km of fiber, with a JXP-6 installed.
2 In any 4 MHz band within the specified bandwidth.
3 All SG4 transmitters operate with a nominal 28 dBmV total power at the node housing input.
4 Includes 100 km fiber, 2 dB QAM dispersion penalty and connector loss.

Specifications are subject to change without notice.

MGBI

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